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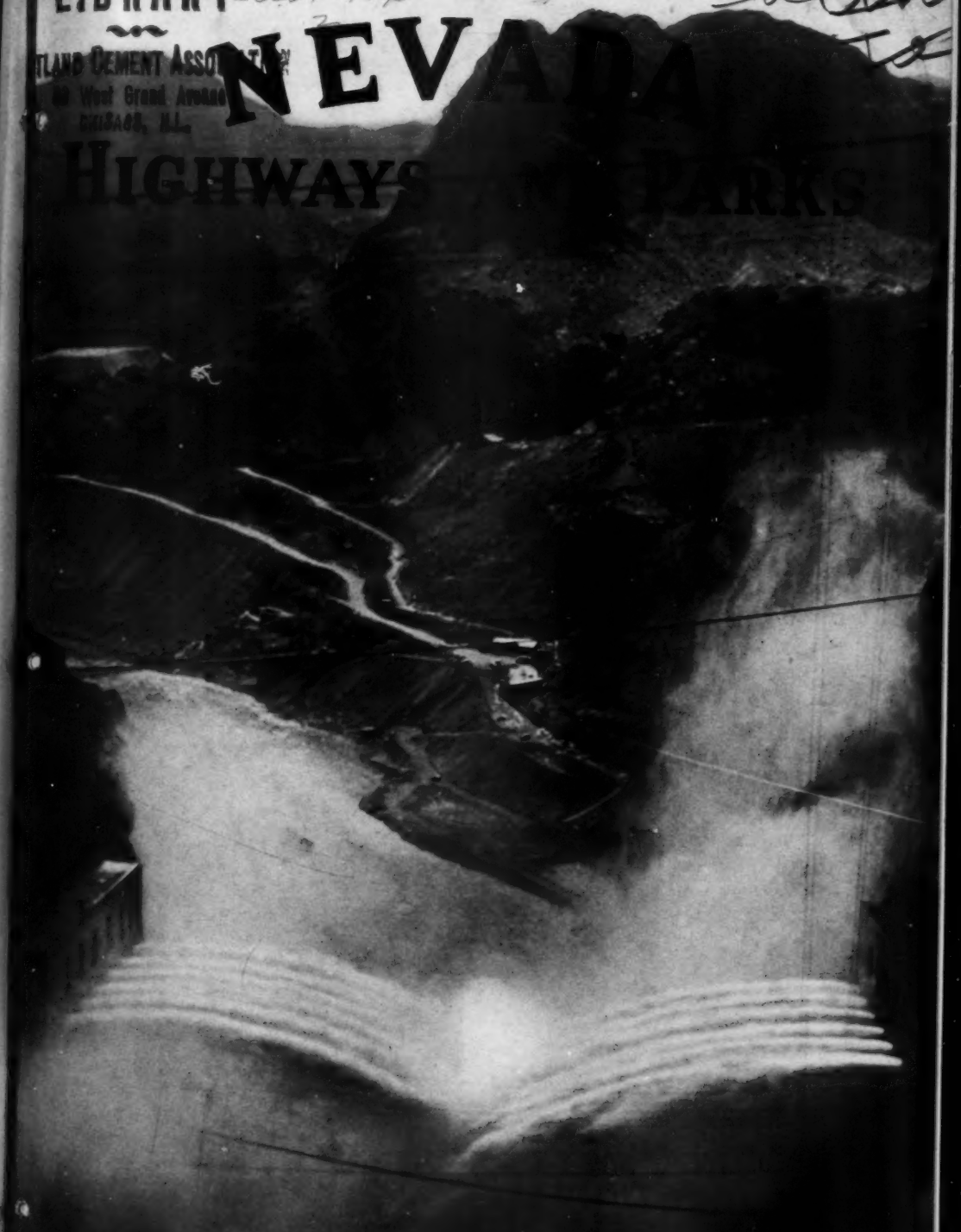

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NOVEMBER 1936

A section of the thriving city of Ruth, White Pine County, Nevada. Copper deposits of vast extent were discovered near this place many years ago, and through the intervening years have been developed into one of Nevada's major mining activities.

Details of the copper pit at Ruth, Nevada, showing eight distinct terraces from which thousands of trainloads of copper ore have been taken during the past 30 years of operation in the process of digging this "the greatest man-made hole in the world."

NEVADA HIGHWAYS AND PARKS

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A COPPER PIT THIRTY YEARS DEEP

ON the sage-dotted hills of eastern Nevada at Ruth, in White Pine County, copper miners have performed a major operation on the face of the earth by gouging out a hole one mile long, a half mile wide, and now over 700 feet deep. This immense pit, commonly referred to as the "greatest man-made hole in the world," has been scooped out by the combined attacks of well-placed blasting charges and incessant steam and electric shovel gnawing during the last thirty years. The process of blasting and mechanically biting away at the rocks on the bottom and sides of this cavity promises to continue for many years.

Aside from the picturesqueness and size of the pit, its value to mankind, and more pointedly to Nevadans, lies in the worth of its past and its future copper tonnage—a tonnage which has substantially enriched its owners as well as supported hundreds of persons dependent upon the mining operations. Incidentally it has gradually elevated the Ely district from a position of small importance to that of the greatest metal-producing section of the State and one of the greatest copper-producing sections in the world.

Vast waste piles of rock dumped over the surrounding terrain in addition to millions of pounds of copper with a fabulous value have been extracted from this region since Indian John, an early-day character, showed the district to a party of prospectors back in 1867. Indian John had found some rich "float" or rock showing free gold and, after some persuasion, was induced to disclose his secret to the prospectors. They, in turn, organized the area as the Robinson district, in honor of one of the members of the party, and immediately began its working. But these prospectors were after the gold and silver they believed to exist in the neighborhood, and gave little consideration to the copper possibilities which colorfully manifested themselves in the rocks. They developed the ground for the yellow and white metals with some success for a few years. Eventually the gold and silver production diminished and became a part of the history of the district. Realization of the enormous possibilities and value of the copper ore deposits lying below the surface rocks did not come until forty years later. In the meantime, however, other gold and silver discoveries in the district followed Indian John's find. These also proved of varying value and of relatively short duration.

In January 1868, the riches of Treasure Hill, at Hamilton, some 50 miles west of Ely, also in White Pine County, were discovered. It was a new silver strike which held out great promise. In fact the Treasure Hill deposits have been described by some experts as the "richest silver

Gigantic power shovels stationed on the various levels ceaselessly bite away at the sides and bottom of this immense copper pit to fill trainload after trainload with the raw material which is then hauled to the surface and later to the smelter for reduction and refinement.

deposits ever discovered on the North American Continent." Over $40,000,000 worth of the white metal was produced from this sensational strike in a remarkably short time. Eventually this also "played out" and Hamilton entered the limbo of "worked out cities" of the west. The copper deposits around the Ely section still remained—unappreciated and their extent unknown.

There probably was good reason for this situation at the time, for the world had not reached its electrical age and demand for copper. The small supply necessary was obtainable from deposits located in other parts of the world. Men of that day did not dream of the close relationship which later would exist between the electrical industry and the production of copper.

So, as far as copper was concerned, the district lay practically neglected until 1905. A few small workings in the district were operating. These units were consolidated into a larger group in that year, following which major activities gained momentum. Surrounding fields were prospected and studied, and experts of the time estimated that the deposits around Ruth and Copper Flat contained over 26,000,000 tons of ore. In that day the estimate seemed more like a dream than a practical thing.

Construction of a railroad followed immediately after the consolidation, and this medium of transportation was completed in 1906. Work on the construction of a mill and smelter was also started in the same year. After the expenditure of many millions of dollars for development and construction work, the first metallic copper was produced on a large scale in May 1908. Forty years after the excitement engendered by the wonderfully rich discoveries of silver at Hamilton, the mining industry of White Pine County became centered in Ely, the predominant color of the metal produced changed from yellow and white to red and the Age of Copper was ushered in.

To mark the beginning of this new era the value of the mineral production from the district rose from $2,363 in 1907 to $2,063,888 in 1908, or an increase of nearly a thousand percent. The electrical age had dawned, and with this change in the mode of living, demand for copper, so vital in the new scheme of things, increased

Crevasses resulting from the block-caving system of mining the copper ore in the Ruth, Nevada, region. The ground section to the left, upon which the trees are noted, has gradually dropped from the level upon which the two men are seen standing.

by leaps and bounds. Copper production in the Ely district continued to increase until it reached the amazing sum of $28,478,391 in 1917. This banner production occurred, however, at a time when the nations of the world were at war and crying for copper. The maximum value, no doubt, was due in large part to the war prices.

For a time following the world conflict production decreased materially, but never did cease. The value of the metal output from the district in 1929 was approximately $21,500,000 and that for 1930 reached a total of over $20,000,000.

Figures show the production of copper for 1935 in the State of Nevada amounted to 76,243,000 pounds valued at $6,329,169. This compares with the output of the previous year valued at $3,328,890. Most of this copper came from the Ely district.

While other major operations in the Ely district produce copper ore by shaft-mining methods, the more spectacular and the largest scale operation is that done by the pit method. It is particularly interesting to note that the organization carrying out the pit method of mining combines, in a single compact unit, large steam and electric power-shovel operations, a block caving mine, a concentrator, a smelter, a railroad, and a large power plant. All of these are located in the Ely district, the mines being situated at Ruth, while the reduction works are centered at McGill, 14 miles distant.

In keeping with the importance of the district as a mining and industrial center, the Nevada Department of Highways has modernized all the arterials in that section for the steadily increasing traffic. Lincoln Highway (U S 50), comprising the principal east and west route, has been hard surfaced throughout its whole length. Likewise U S 93, a north and south arterial, which serves the district as well as leading toward the Yellowstone and Glacier Park areas, to the north, is highly improved the entire distance from the south to the north boundary lines of the State, with the exception of one stretch which is now under construction.

Since the commencement of major operations in White Pine County in 1908, over 50,000,000 tons of ore have been treated and refined by one organization alone. In addition, great reserves of ore are still available.

As the district proceeded in its development and the approximate limits of the known field became fairly well defined, churn drilling over the entire surrounding district was inaugurated. This work is being carried forward at the present time. Results from the study of the drill holes and the consequent core tests are expected to materially extend the proven field and increase the ore reserves available for future development.

During the thirty years of operation there has been mined and treated approximately 70,000,000 tons of ore, and 103,000,000 tons of waste has been removed and placed on the dumps.

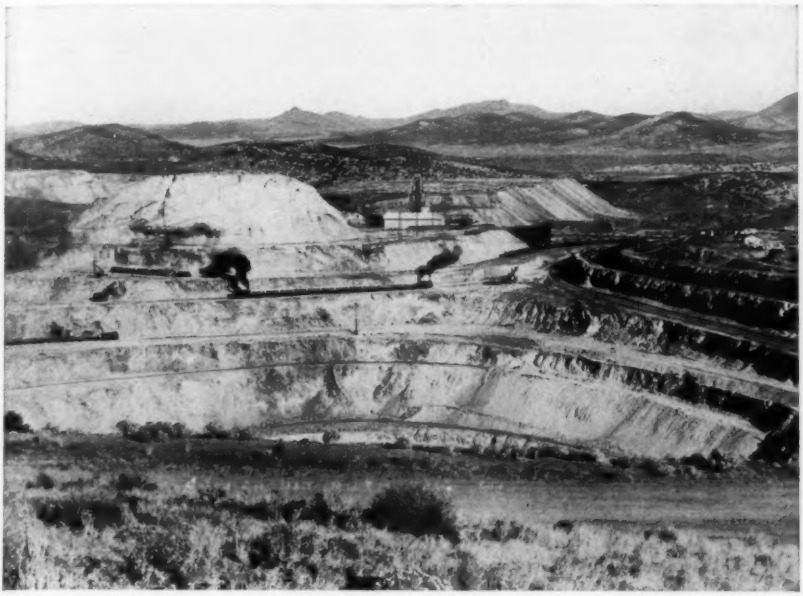
Two general methods are followed in extracting the low grade ores from the ground. First, and perhaps the more spectacular, is the open-pit method; the second method is known as the block-caving system. Quantity production has cut costs of operations and facilitates working the low grade ores.

The Copper Flat pit at Ruth has been mined by the first of these methods and, at its present stage, has all the appearances of a footbal stadium built on an infinitely greater scale than even our present-day sports fields—gigantic as they, themselves, might be. Like the football stadiums the outline of the copper pit is oval in shape, with sides inclining toward the center. Unlike most gridiron fields, however, this "ore stadium" has been sunk into the earth instead of building the structure above the ground level.

Players at the Copper Flat Pit are transformed into huge locomotives and 60-ton steel cars—usually nine to the train—

Our Cover Illustration

SEPTEMBER 11, for the first time, all twelve 84-inch needle valves at Boulder Dam were opened and water permitted to spout forth into the Colorado River. It was an event which might be duplicated only on rare occasions. The twelve streams, together with the ball of fine mist rising above their meeting line, and a general view of the lower reaches of Black Canyon are shown in our cover picture.



A corner of the copper pit, showing a train of loaded 60-ton cars nearing the top. Original surface level, before excavation started, is represented in the crest of the hill above the smoking locomotives. All material shown in the terraces is copper ore.

which move about the playing field carrying out predetermined formations, calling shrill signals before executing plays, which in this serious game of copper production consists of hauling out trainloads of ore.

Side and end benches, stepped upward for over 700 feet, could easily provide seating room for hundreds of thousands of spectators. In the vast reaches of the copper pit, these benches support the track rails over which the "ball" (ore) is carried toward the mill. Football referees and umpires might well be typified by the gigantic electric shovels, spotted in various parts of the "playing field," and the constant shunting, back and forth, of trainload after trainload of the copper ore from the bottom of the pit to the surface level could well represent the strategy employed by opposing teams.

The thrill experienced while standing on the edge of the pit and looking down nearly 800 feet to the bottom, noting the various operations of this huge mechanical game of ore "football" is comparable to the thrill of witnessing a spectacular run for a goal made by a home team player. It is really an awe-inspiring and long-remembered sight.

We direct your attention to pages 8 and 9 where you will find a reproduction of an aerial photograph showing the immense copper pit and the general terrain looking westward. On this photograph are shown the pit with trains of cars on several of its terraces, the extensive dumps of waste rock, the city of Ruth, Nevada, and a long stretch of the Lincoln Highway coursing toward western Nevada.

It took over 30 years of constant effort to build this "stadium."

The very nature of the ore deposits in their geological beds necessitated removal of millions of tons of waste rock before the valuable ore bodies could be attacked and utilized. In view of the fact that the copper, since its original deposition, has been leaching downward for ages, barren waste rock with small quatities of copper was left on top as a surface covering.

Sandwiched between a deeper strata of rock and the surface covering lie the great ore bodies. In the mantle rock copper impregnation has been too low for profitable operation. Reversely the deeper rock, lying underneath the ore bodies, forms a flooring on which rest the ore masses containing a higher metallic content.

Surface waste rock over the entire area of the pit varied in depth, and this valueless material had to be carted away before the ore bodies could be tapped and extracted.

The ore mass itself has a proven depth extending downward many hundreds of feet before contact is made with the lower grade and less fertile primary zone. Roughly, the impregnated rock assumes the shape of a belt or tabular rock, varying in width at present from approximately three-quarters of a mile to one and one-half miles, and is completely surrounded by limestone. In fact, it was the limestone of the district which had been penetrated or intruded by a monzonite porphyry dike or wall in which the copper values are found. Blasting and breaking down the mass of this porphyry dike so that it can be readily removed for reduction and smelting constitutes the pit-mining phase of the copper production of these mines.

The tremendous task of removing the waste rock was started in 1905, while the surface presented an unbroken continuity of small hills and valleys. Blasting broke down and loosened the rocks sufficiently to facilitate power-shovel operations. These shovels worked strenuously and constantly to reach the fertile ore ground.

Great holes began to appear in places where previously the earth's surface had a well-defined regular outline. Excavated waste rock was removed and sometimes hauled a mile or more to build up the far-flung dump piles so conspicuous in the district today.

As the years passed, electricity supplanted steam for the power shovels, the individual pits constantly deepened as well as widened until an unbroken surface depression manifested itself. As the work progressed the main pit gradually assumed

A general view of the mill at McGill, Nevada, where the copper ore from the huge pit, nearly 800 feet deep, at Ruth, 14 miles distant, is taken for smelting and refining. Its rated capacity of operations is in excess of ten thousand tons reduction daily.

The above shows a street scene in Ely, center of the extensive copper mining activities of eastern Nevada. Ely, a modern city, with comfortable residences, good hotels, and well-paved streets, likewise serves an important cattle and sheep grazing section.

its present outline. When depth increased and the problem of moving ore from the bottom and sides of the depression to the surface became more complex, the benching system was adopted.

Upon each bench one or more power shovels were stationed, and these kept chewing and biting away to the extent of approximately five cubic yards at a mouthful, until all the waste rock had been scuffed off.

Later the same process was used to loosen and remove the pay rock. This benching method is still employed, with the difference that the upper benches or levels, built into the side and end walls, are now used as roadbeds on which track rails are laid. Each terrace or bench, by grade, is connected to the terrace or bench above and below. These are designed as a railway switchback system over which are rolled the empty and loaded cars to and from the top rim to the pit bottom.

The method of ore removal has been simplified. A string of empties is moved to the shovel site, ready for loading. Immediately the electric power shovel picks up from the pit floor or side walls four or five cubic yards of ore material, swings it over to the empty hopper and drops the load. This monotonous process continues until all cars of a given train are filled. Incessantly, day and night, trainload after trainload of ore in like manner is scooped up and dumped into the waiting cars.

About eleven of these monster shovelfuls fill a car and this takes less than five minutes of time, under normal conditions. When eight or nine cars have been filled to capacity the locomotive engineer gives a signal, a second puffing locomotive rushes forward to help, couples to the rear end of the train, and the ascent to the rim level is started.

As rapidly as one train has been filled and hauled away from the shovel station another with empties rolls into place.

Two locomotives are required to haul the loaded train to each successive higher bench or level, over the steep grades of the switchback, until all fourteen levels have been topped. At the rim level the loaded

[Please turn to page 16]

XU

HUNT FINDS MOUNTAIN CITY COPPER

FOR twelve years a persistent prospector and graduate mining engineer spurred on by self-confidence and courage, pecked away at the "everlasting hills" in the Mountain City district in northern Elko County, Nevada, chasing a dream of fortune. As a mining engineer in many of the western States and also in Alaska, he had followed his chosen profession for many years. Prospecting, however, was a first and irresistible love, with gold and silver preferred. The call of the hills eventually lured him into the area near Duck Valley Indian Reservation, on the Nevada-Idaho border line. There his dream was realized.

Realization of the dream, however, did not come without many trying and discouraging difficulties—difficulties which, at times, seemed insurmountable.

True, the Mountain City district since it was organized as the Cope district, in 1869, had boasted the recovery of over a million dollars in silver, plus a little gold. Intense mining activity continued there until 1881. Production following that year became small and intermittent, although three reduction mills were built in the district during the nineteen hundreds, one a 50-ton flotation plant being erected and operated as late as 1921. These mills flourished for a time then closed down. Apparently no more ore was to be found in the adjacent fields.

Mountain City itself sprang into existence during this period of development. In size, the town wasn't much to speak of, although during its best days it claimed a population of nearly one thousand. Several stores at which grub was sold to the prospectors, a saloon or two, and a number of roughly built, one-story cabins, lining the road on either side, for sheltering the inhabitants were all characteristic of a typical western mining town. There wasn't a railroad within a hundred miles of the

Original workings at the Mountain City copper deposit in northern Elko County, Nevada, showing headframe and log cabins where for twelve years a veteran of the hills struggled against overwhelming odds before realizing his dream of fortune in copper.

Mountain City, a typical western town in northern Elko County, Nevada, as it appeared shortly before a copper deposit of tremendous potential value was discovered about three miles south, several years ago. Ore was struck at a depth of nearly 250 feet.

place. The same applies even at the present day. High mountains closed in on all sides. During the winter heavy snows, prevalent in the region, blocked the one road—the only means of access or outlet—and forced the community to "hole in," isolated from the rest of the world. This road now has been put in good condition for summer hauling and traffic service. Plans have been worked out for a primary highway, open to traffic the year around, all the way from Elko to the mine.

Aside from those who lived in the community and the miners working in the hills, not many persons braved the hardships of the surrounding region incident to scratching out an existence. A few hardy ranchers, finding fertile soil and sufficient water in the upper valley of the Owyhee, cultivated limited crops, or grazed cattle, sheep or horses in the lowlands and on the nearby hillsides.

Mountain City, as a natural sequence, became the supply center for the district. Prospectors for miles around, as well as ranchers, came to this small mountain village to obtain food or equipment, and to congregate while playing games, swapping tales of important discoveries, or unfolding their dream of riches.

When the silver ore, found in small fissure veins in a granitic country rock, played out, the miners left the locality and the town shrunk. What remained of Mountain City hung on by the slenderest thread. Its stalwarts, about a hundred in number, refused to be defeated. The little community becoming more or less dormant, struggled through the years, always hoping and believing that new silver strikes nearby would supply the magic touch needed to revive activity. Little thought, apparently, was given to other metals. Gold and silver, the more spectacular, were the paramount objects of their search. No sensational discoveries were recorded as the years passed, and Mountain City settled in its humdrum existence, accepted the rule of fate and struggled on.

In such a setting the veteran of the hills found himself upon entering the district to prospect, in 1919, making Mountain City his headquarters. His quest was for gold and silver—preferred. Like many others,

he tramped the hills for days away from camp, looking for leads, picking up or chipping off fragments of rocks, examining them, crushing and panning the most likely looking, or casting others aside as worthless. At night, weary and in solitude, the evening meal was prepared and eaten, and camp made ready for the night. Perhaps, at times, while enjoying the warmth of an evening campfire or a soothing pipe, his dream of fortune took more definite form and strengthened his courage to continue the search.

With this as a comforting thought he made ready to lie down for the night's rest where the stones were his pillow, the stars his sheltering roof, and the wild howl of the coyote his bedtime song. Too much lonely camp life wearies even the veteran prospector and gives anything but an encouraging outlook. At any rate, the prospector stuck it out and made a careful and thorough geological study of the surrounding region.

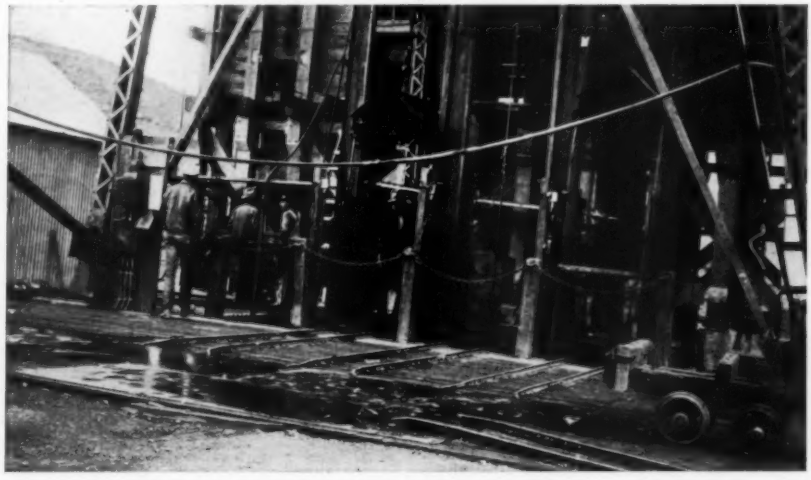
About three miles south of Mountain City, rocks of a metamorphic character came to his observation and aroused his interest. A brownish weathered outcrop showing occasional specks of a green discoloration quickened this interest. The discolorations were indeed very small—almost minute in character and widely separated in frequency. A less observing searcher would in all probability have passed them by as having little value, and unworthy of further development, for the neighboring country rock was plainly of a granitic texture and not too favorable for metallic deposits of any great extent.

The discolored outcrop was traced in all directions and its outline roughly defined. Assays showed little evidence or trace of gold or silver and a very sparse indication of copper.

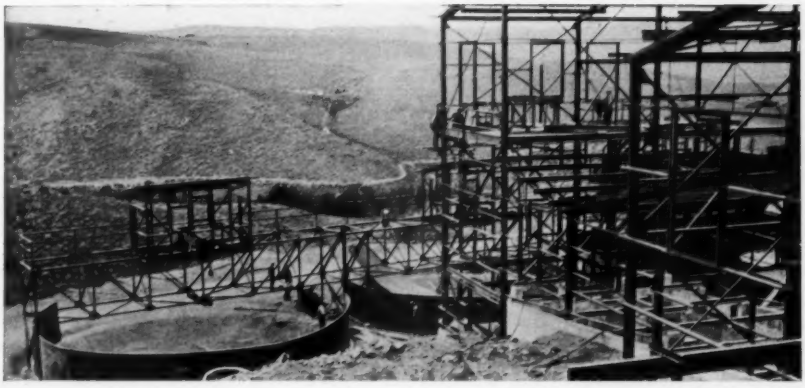
Surface conditions coordinated with geological surroundings resulted in evidence which convinced the veteran of the hills that copper should exist at depth. There was, however, no ore in sight at the surface and very little distinctive copper indication. Faith and hard work only would prove the ground.

Acting under this urge the geologist-prospector staked out six claims and protected them legally. Each claim covered ground which extended a length of 1,500 feet and a width of 600 feet.

As time went on the geologist-prospector



Modern surface shaft workings used at the Mountain City copper deposit mining operations. These shafts, extending downward into the earth for more than 500 feet at the present time, afford conveyance from the surface to the lower working levels.



Top, shows general view of new Mountain City concentrator with mine bins at right; center, a partial view of thickener tanks and filter building; bottom, crusher and mill buildings connected by conveyor building, all in the progress of construction.

completed legal development requirements, then restudied the ground and formations to determine the most appropriate place for sinking an exploration shaft.

But sinking mine shafts costs money. Difficulties in financing the venture arose. The prospector-geologist's faith was strong but his finances were weak.

Cautiously looking about for assistance, a partner was found who agreed to grubstake the 60-year-old veteran of the hills, for a specified share in the undertaking. Agreement was effected, work on the shaft started, and the hole began to gain depth. Eventually it became necessary to provide mechanical means supplementing hand work. A simple elevating system was needed to hoist waste rock. Timbering was required in the shaft, a house for shelter, besides innumerable other implements and materials, all of which necessitated funds to finance.

The arduous labor of sinking the shaft continued for months and no ore came in sight. Losing faith in the venture, the grubstaking partner became discouraged and decided to terminate the agreement. However, after some persuasion, he agreed to continue the arrangement providing expert counsel could find merit in the project. As a result technical advisers were sought and consulted.

These men of science made the journey to the isolated district in the Owyhee Valley, examined and studied the ground thoroughly, together with the development work already completed. Doubtful of the possibilities, they made a negative report and advised the client against further risk, declaring the district, in their opinion, contained little of value. Following this adverse report the grubstake stopped.

Discouraged at the outlook, but far from defeated, the veteran prospector persisted in his faith and determined to carry on the work. Finances to continue the development had to be gotten somewhere. All available personal resources to further the venture had become exhausted.

Contact was established with agencies for the submission of lists of names of persons who would possibly take a chance on the venture. After this list was obtained, and prospectus formulated which gave a very frank and precise picture of the situation, explaining the risks involved, the possibilities of success or failure, a mining company was organized.

Share certificates were issued, names from the lists inserted, with the number of shares left blank, and these share certificates were then forwarded to the persons selected.

With each certificate of share was included a statement declaring, in substance, that an assessment of a minimum of two cents and a maximum of five cents per share was due on the stock.

This plan was followed, and as a result sufficient funds were obtained to carry on the development work and continue the sinking of the shaft. The shaft was steadily driven downward through barren rock until November 1931, when, at a depth of 227 feet, an orebody was encountered. Not a single pound of ore had been struck above that level.

In the spring of 1932 five carloads of copper ore were taken from the bottom of the shaft and sent to the Salt Lake Valley smelters as an initial shipment. When the news leaked out that the ore had averaged 40 percent copper the mining world was electrified and experts and engineers from all parts of the globe came to Mountain City to examine the sensational new strike.

Eventually representatives of large copper interests inspected the mine, examining and studying all geological phases. These experts all submitted favorable reports to their superiors which resulted in negotiations leading to the purchase and control of the mine.

Today intensive and large-scale development work, further explorations above and under ground, supplemented by the erection of a large reduction mill of the latest type have awakened the citizens of Mountain City, as well as the whole State of Nevada, to a full realization of the importance of the dream of S. Frank Hunt, the prospector-geologist.

The faith of this veteran prospector has been justified, his dream of fortune has materialized, and his gratitude to the State of Nevada, where the deposits are located, has been manifested in substantial benefactions to its institutions of learning for furthering the advancement of the science of prospecting and mining.

ROAD STRIPER MAKES NEW RECORD

COMPACT and self-contained, the "Seagull," new motor-driven road-striping machine of the Nevada Department of Highways recently broke all previous Nevada records when it painted an excellent four-inch white line down the center of the highway between Reno and Carson City, covering a distance of 27 miles in six hours of operation. Under the old methods, two and one-half days were required to do the same work.

On a second test a few days later, over the Reno-Fernley section of the Victory Highway, U S 40, the Seagull, under more exacting circumstances, set down a four-inch white stripe for a distance of fourteen miles in three and one-half hours. This feat was the more surprising because it included the time required to transport the machine from the equipment shops of the department to the site of operation as well as the return trip. The department's equipment shops are located about two miles east of Reno.

On this particular test the Seagull was taken to a point about 20 miles east before line painting started.

In addition to its painting speed the Seagull has a cruising speed of over 50 miles an hour. The advantage in this feature lies in the fact that the machine can be taken from the central, or branch, maintenance depot, driven at cruising speed to the section of the road to be striped, and returned to the depot station for the night.

At the striping site, within a few minutes, the operator can drop the pilot wheel into proper position, throw in the air compressor clutch, adjust the sprayhead to the proper level above the road surface, turn a valve or two, start the paint flowing and just keep "rolling along" at painting speed. When the end of the section is reached the sprayhead is raised by a control lever, which automatically shuts off the paint flow, sprayhead is thoroughly cleaned, compressor clutch disengaged, pilot wheel lifted and secured and the "flying painter" again is ready to roll forward at cruising speed to the next section to be striped.

In addition to its speed and uniformity of spread, the self-propelled painter is

The above reproduction shows the painted center line on the Victory Highway at the Fernley, Nevada underpass. The underpass itself was completed early this year as a Works Program grade separation project on the State's Federal aid highway system.

safer to operate than the earlier models used. Under the two unit method the operator directing the pilot wheel was seated on the pilot unit cut ahead of the propelling unit. There was danger of being struck by oncoming cars, or heedless drivers cutting in ahead too quickly. This also slowed down operations.

Seagull can be readily maneuvered and, in an emergency, the operator can quickly raise the sprayhead from the road surface. With the automatic shutoff the car can be guided to right or left without dripping paint off the line. Through its shorter wheelbase danger is minimized, for its overall length is less than 15 feet.

Special quick-drying paint, either white or colored, permits traffic to cross over the line within five minutes after the stripe has been laid.

The entire machine, including pilot wheel with adjustable frame, paint tank, sprayhead, air compressor and tank, propelling engine, and fuel tank, has been designed and built in a single assembly unit. Reversing the usual custom, a four-cylinder engine, which generates sufficient power for mobility and also for air compression, is mounted on the frame in the rear. Radiator and fan have been constructed to draw air over the engine before passing out through the radiator fins. The engine itself is of the standard water-cooled type.

Air pressure up to a maximum of 300 pounds can be generated. The machine while painting operates on a low-pressure system, using not more than 30 or 40 pounds. A 60-gallon steel plate paint container, with electrically welded joints, is mounted on the front of the car frame. A mechanical agitator keeps the paint in proper liquid mixture.

A hollow needle valve stem controls the paint flow at the sprayhead and through special design this sprayhead can be thoroughly cleaned immediately the flow of paint has been shut off. Adjustable brushes attached to steel plates form guides by which width of line and spread of paint are controlled.

While the present unit has been constructed as a shop model, refinements are expected to be made on the "Seagull" in the near future.

DEEP COPPER PIT AT RUTH

[*Continued from page 7*]

cars are rolled on to sidings, coupled to others, and later hauled to the reduction mill at McGill, 14 miles away.

Ofttimes while many puffing locomotives are moving the rolling stock on the tracks over the pit bottom, the entire pit atmosphere is heavy with clouds of black smoke.

In other parts of the mile-long cavity gangs of railroad workers can be seen changing track lines so that new shovel stations may be established.

The walls of this monstrous pit on all sides present a colorful picture. Particularly at the east end the many shades of green, interspersed with yellow and brown patches, are most pronounced.

Under the block-caving system of mining, shafts are sunk through the overburden and into the ore bodies. Drifts or branching tunnels radiate from this main shaft in all directions to tap the ore. Ore is extracted and then lifted by skip and elevator to the surface, then automatically dumped into cars and taken to the mill.

Large underground sections are blocked out and the ore taken from one section until all available pay rock has been removed. The resultant open chamber is then abandoned and another section attacked. The process continues until the underground ore blocks have been worked out. This method also has been in use for many years.

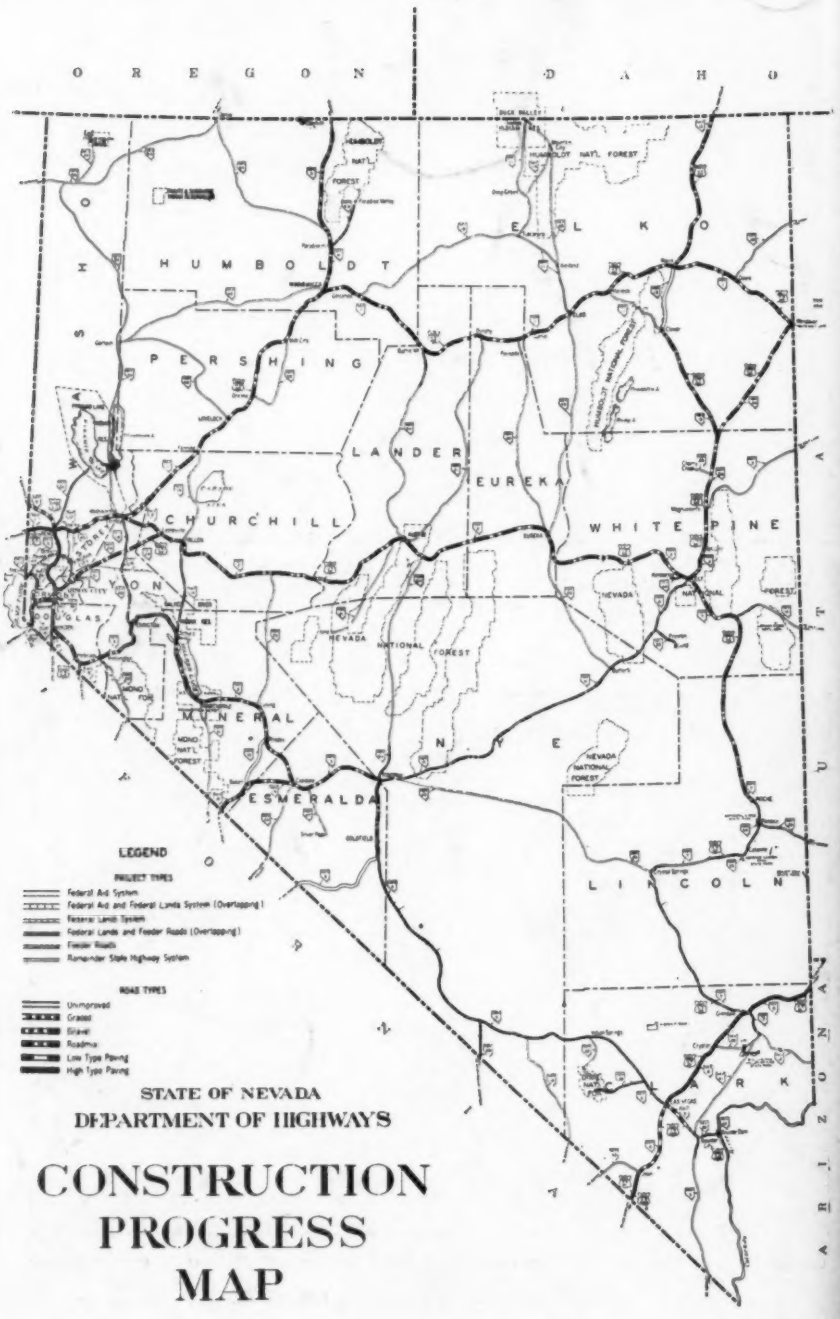
With all underneath supports removed, the upper rock begins to cave and settle, eventually filling the chamber. The sinking movement gradually reaches the surface where it is evidenced by irregular cracks and fissures, striking in all directions over a wide area.

Many acres of surface ground in the Ruth area have undergone this sagging movement. These areas, are, of course, fenced off and safe-guards established.

With the development of the Boulder Dam power project, and the ultimate extension of the transmission lines into the Ely district, copper mining in eastern Nevada, stimulated by further increases in the price of copper, has every promise for a prosperous and healthy future.

Boulder Dam's twelve-stream water fall—a man-made Niagara—as shown in its recent grand opening, draws a heavy mist veil across the conquered Colorado, below the dam, to hide all but the crown of the rock walls on Nevada's side of Black Canyon.

Copper in these huge Boulder Dam generators will gather, and ultimately transmit over copper cables, the electrical energy needed to supplement power and light in the great copper and other mining districts centered around Ely and Pioche, Nevada.


O R E G O N
I D A H O
H U M B O L D T
E L K O
P E R S H I N G
L A N D E R
E U R E K A
C H U R C H I L L
W H I T E P I N E
M I N E R A L
E S M E R A L D A
N Y E
L I N C O L N
LEGEND
PROJECT TYPES
Federal Aid System
Federal Aid and Federal Lands System (Overlapping)
Federal Lands System
Federal Lands and Feeder Roads (Overlapping)
Feeder Roads
Remainder State Highway System
ROAD TYPES
Unimproved
Graded
Gravel
Roadmix
Low Type Paving
High Type Paving

STATE OF NEVADA

DEPARTMENT OF HIGHWAYS

CONSTRUCTION PROGRESS MAP

STATE PRINTING OFFICE OF NEVADA, CARSON CITY

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